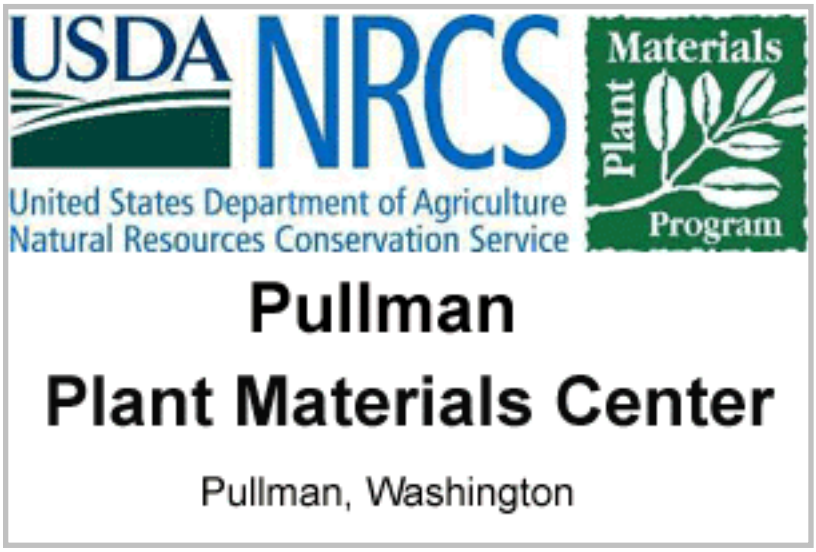
Protocol Information

Dave Skinner
PMC Farm Manager
Pullman Plant Materials Center
Room 104 Hulbert Hall WSU
Pullman,
Washington 99163-6211

509-335-9689
509-335-2940 Fax
abbie@wsunix.wsu.edu



Family Scientific Name:	**Hydrophyllaceae**
Family Common Name:	**Waterleaf**
Scientific Name:	***Phacelia heterophylla* Pursh**
Common Name:	**virgate or varileaf phacelia**
Species Code:	**PHHE2**
Ecotype:	**Paradise Creek drainage near Pullman, Washington.**
General Distribution:	**Western North America from British Columbia east to Montana and south to New Mexico. In eastern Washington it is usually found in dry, open, often rocky areas, especially where there is some disturbance. It is a facultative upland species (US Fish and Wildlife Service 1988)**
Propagation Goal:	**Plants**
Propagation Method:	**Seed**
Product Type:	**Container (plug)**

Time To Grow:	**3 Months**
Target Specifications:	**Tight root plug in container.**
Propagule Collection:	**Fruit is a capsule. Seed is dark brown and pointed with a pitted surface. Seed is collected when the seed begins to shatter in late July or early August. The plants are covered with short hairs which are irritating to the skin, especially when dry. Gloves should we worn when handling the plants and plant parts. Seed can be stripped from the inflorescence and stored in paper bags at room temperature until cleaned. The entire inflorescence can be clipped from plants in seed increase plantings and dried under cover on tarps. Wild plants should never be collected whole.** **We determined 1,233 seeds/ gram or 559,172 seeds/lb.**
Propagule Processing:	**Small amounts are rubbed to free the seed, then cleaned with an air column separator. Larger amounts are threshed with a head thresher, then cleaned with air screen equipment. The equipment operator should wear gloves and a dust mask and perform threshing and cleaning operations outdoors. Position the equipment such that a breeze will carry the dust away from the operator. Clean seed is stored in controlled conditions at 40 degrees Fahrenheit and 40% relative humidity.**

Pre-Planting Treatments:	**Germination occurs at 15-20 degrees centigrade in the dark (Maguire & Overland 1959, Chirco & Turnoer 1986). Trials conducted at the PMC comparing untreated seed with cold, moist stratified seed showed no benefit from stratification. 95% germination occurred without stratification. 45 days of cold, moist stratification also resulted in 95% germination. Seed sown in containers in November and left outdoors under cool, fluctuating spring temperatures began germinating in mid-March and ultimately reached 98% germination, but the plants were not ready to be transplanted to the field the same spring.**
Growing Area Preparation/ Annual Practices for Perennial Crops:	**In January seed is sown in the greenhouse in 10 cu. in. Ray Leach Super cell conetainers filled with Sunshine #4 and covered lightly. Head space of ¼ to ½ inch is maintained in conetainers to allow deep watering. A thin layer of pea gravel is applied to prevent seeds from floating. Conetainers are watered deeply.**
Establishment Phase:	**Medium is kept moist until germination occurs. Germination usually begins in 5 days and is complete in 9-10 days.**
Length of Establishment Phase:	**2 weeks**

Active Growth Phase:	**Plants are watered deeply every other day and fertilized once per week with a complete, water soluble fertilizer containing micro-nutrients. Growth is rapid and older plants may require watering every day.**
Length of Active Growth Phase:	**2-3 months**
Hardening Phase:	**Plants are moved to the cold frame in late March or early April, depending on weather conditions. They are watered every other day if the weather is cool, and every day during hot, dry spells.**
Length of Hardening Phase:	**2-4 weeks**
Outplanting performance on typical sites:	**Transplanting is done in early May by using an electric drill and portable generator to drill 1.5 inch diameter holes at the planting site.** **Survival in seed increase plantings without competing vegetation approaches 100%. Transplanting into sites with existing vegetation reduces survival and vigor depending on weather conditions following planting. A few plants will flower the same year but most require another year to produce seed. High success rates were also achieved with fall transplanting into seed increase blocks.** **Plants are short-lived but perpetuate themselves well by abundant seed production.**
Other Comments:	**No insect or disease problems have been noted.**

References:

Buhler, Douglas D., and Melinda L. Hoffman. 1999. Andersen's Guide to Practical Methods of Propagating Weeds and Other Plants. Weed Science Society of America. Lawrence, Kansas. 248pp.

Chirco, Ellen, and Terry Turnoer. 1986. Species without AOSA Testing Procedures. The Newsletter of the Association of Official Seed Analysts 60 (2):2-66.

Hitchcock, C. Leo, and Arthur Cronquist. 1973. Flora of the Pacific Northwest. University of Washington Press. Seattle, WA. 730 pp.

Jolley, Russ. 1988. Wildflowers of the Columbia Gorge. Oregon Historical Society Press. Portland, OR. 331 pp.

Lyons, C.P. 1997. Wildflowers of Washington. Lone Pine Publishing, Renton, WA. 192 pp.

Maguire, James D. and Alvin Overland. 1959. Laboratory Germination of Seeds of Weedy and Native Plants. Washington State Agricultural Experiment Station Circular 349, Pullman, WA. 15 pp.

Parish, Roberta, Ray Coupe, and Dennis Lloyd (eds.). 1996. Plants of Southern Interior British Columbia. Lone Pine Publishing, Vancouver, BC, Canada. 463 pp.

Piper, C.V., and R.K. Beattie. 1914. The Flora of Southeastern Washington and Adjacent Idaho. Lancaster, PA. Press of the New Era Printing Company. 296 p.

St. John, Harold. 1963. Flora of Southeastern Washington and of Adjacent Idaho. 3rd edition. Outdoor Pictures. Escondido, CA. 583 pp.

USDA, NRCS. 2006. The PLANTS Database, Version 3.5 (http://plants.usda.gov). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

US Fish and Wildlife Service. 1988. National list of vascular plant species that occur in wetlands. US Fish & Wildlife Service Biological Report 88 (24).

Citation:

Skinner, David M. 2006. Propagation protocol for production of container *Phacelia heterophylla* Pursh plants; Pullman Plant Materials Center, Pullman, Washington. In: Native Plant Network. URL: http://www.nativeplantnetwork.org (accessed 6 February 2006). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.